



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/008,383	12/06/2001	Gregory G. Freeman	FIS920010321US1	2901

32074 7590 08/01/2003

INTERNATIONAL BUSINESS MACHINES CORPORATION  
DEPT. 18G  
BLDG. 300-482  
2070 ROUTE 52  
HOPEWELL JUNCTION, NY 12533

EXAMINER
----------

DICKEY, THOMAS L

ART UNIT	PAPER NUMBER
----------	--------------

2826

DATE MAILED: 08/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/008,383

Applicant(s)

FREEMAN ET AL.

Examiner

Thomas L Dickey

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 July 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 12-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-11 is/are rejected.
- 7) ☒ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2                      6) ☐ Other: \_\_\_\_\_

Art Unit: 2826

## **DETAILED ACTION**

### ***Election/Restriction***

1. Applicant's election without traverse of Group I, claims 1-11 in Paper No. 5 is acknowledged.

### ***Oath/Declaration***

2. The oath/declaration filed on 06 December 2001 is acceptable.

### ***Drawings***

3. The formal drawings filed on 06 December 2001 are acceptable.

### ***Priority***

4. Applicants have made no claim for priority.

### ***Information Disclosure Statement***

5. The Information Disclosure Statement filed on 06 December 2001 has been considered.

Art Unit: 2826

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, line 13, "the emitter layer" has no antecedent basis. It is noted that "an emitter layer" is introduced in claim 2. The claims will be examined on the assumption that when applicant wrote "the emitter layer" in claim 1, he meant "the emitter."

Correction is required.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 6-8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over TAKA et al. (4,975,381) in view of CHEN et al. (5,017,990).

Taka et al. discloses a bipolar transistor, comprising a substrate 11, a semiconductor intrinsic base layer 30 formed by blanket epitaxy on the substrate 11, a collector layer

Art Unit: 2826

13 formed on the substrate 11, an emitter 32 formed over the semiconductor intrinsic base layer 30, forming a junction between the semiconductor intrinsic base layer 30 and the emitter 32, an extrinsic base 28 formed adjacent to the lateral portion of the emitter 32, a raised extrinsic base layer 20A comprising one of a highly-doped polysilicon or a highly-doped amorphous silicon, namely, a highly-doped polysilicon, a base electrode 34A formed on a portion of the extrinsic base layer 20A, a collector electrode 34C formed on a portion of the collector layer 13, an emitter electrode 34B formed on a portion of the emitter 32, and a sidewall spacer 23A, comprising one of a silicon nitride or a silicon dioxide, namely, a silicon dioxide, formed between and electrically isolating the emitter 32 and the extrinsic base layer 20A. Note figures 1F, 1Q, and 2D of Taka et al.

Taka et al. does not disclose that the emitter comprises a pedestal having a top which contacts an emitter layer, or that the junction at a lateral portion of the emitter extends farther into the intrinsic base layer than the junction at a center portion of the emitter. However, Chen et al. discloses a bipolar transistor having a semiconductor intrinsic base layer 2 and an emitter 11 comprising a pedestal (the limits of the pedestal are seen as lines 10D) having a top which contacts an emitter layer 10A, where the junction between the semiconductor intrinsic base layer 2 and the emitter 11 at a lateral portion of the emitter 11 extends farther into the intrinsic base layer 2 than the junction at a center portion of the emitter 11. Note figure 1 of Chen et al. Therefore, it would have been obvious to a person having skill in the art to replace the emitter of Taka et al.'s bipolar transistor with the emitter comprising a pedestal having a top which contacts an emitter

Art Unit: 2826

layer, where the junction at a lateral portion of the emitter extends farther into the intrinsic base layer than the junction at a center portion of the emitter, such as taught by Chen et al. in order to allow a mesa-type intrinsic base to be formed between recessed oxide portions out of a conformal p-type layer of which portions (said portions ultimately forming the lateral portions of the emitter) are then converted to n-type, thus provide an efficient means of epitaxially laying down the base, while at the same time, building a "built-in" emitter (thus saving steps of implantation and/or diffusion) that effectively prevents current from leaking past the emitter.

Furthermore, with respect to claims 4, 8, and 10, Taka et al. and Chen et al. disclose the claimed invention except for the lateral portion having a depth in a range of approximately 20-40 nm, the sidewall spacer having a width in the range of 10 to 70 nanometers, and the emitter layer having a thickness in the range of 30 to 200 nanometers. It would have been obvious to one of ordinary skill in the art at the time the invention was made to produce the claimed invention in the depth, width, and thickness ranges claimed, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. See also In re Peterson, 65 USPQ2d 1379.

Art Unit: 2826

***Allowable Subject Matter***

8. Claims 5, 9, and 11 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112 set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.


***Conclusion***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas L Dickey whose telephone number is 703-308-0980. The examiner can normally be reached on Mon-Thu 8-6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas L Dickey whose telephone number is 703-308-0980. The examiner can normally be reached on Tues-Friday 8-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on (703) 308-6601. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

**TLD**  
**07/2003**

  
**Minhloan Tran**  
**Primary Examiner**  
**Art Unit 2826**